

History of Leigh Creek and its Early Airport Radio Installations

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A few paragraphs on Leigh Creek today have been added to the original

Introduction

When one looks back into the history of power in South Australia, one has to think of Leigh Creek which supplied coal to the State's power stations, at Osborne and Port Augusta over a period of 70 years. Whilst my story discusses much of the general history of Leigh Creek and its coal mine, I will concentrate on its airport and the initial installation of the airport radio communication facilities of which I was directly associated and the Airport radio navigation facilities.

Leigh Creek (formerly Leigh's Creek) is a coal-mining town in eastern central South Australia (SA), 560 Km north of Adelaide. At the 2006 census, Leigh Creek had a population of 549. Situated to the west of the northern Flinders Ranges, the current town is 13 km further south than the original town which was moved in 1982 to allow the expansion of the mine over the original town location. As a result, most facilities and buildings in the town are only a little over thirty five years old, with relatively modern designs.

The area was named Leigh's Creek after its first settler, Harry Leigh, in 1856. Coal was discovered and small quantities mined from 1888 from an underground mine. The town to support the mine at that time was called Copley, after William Copley, an MP and Commissioner of Crown Lands. However the coal was not mined in a significant commercial manner until 1943 in an effort to make South Australia more self-sufficient for its energy needs, with less dependence on New South Wales. If he was to attract business to SA, the premier Sir Thomas Playford saw a need for a local energy source.

Aeroplanes of the 1940/1950 era, flying the large distances of the length and breadth of Australia, required a number of airports on the way where they could land and refuel. For the Adelaide to Darwin run, the airports were originally Mt Eba, Oodnadatta, Alice Springs, Tennant Creek and Katherine. Mt Eba was essentially a cattle station and when Leigh Creek became established as a town, an aerodrome was built and the first for landing stop was changed from Mt Eba to Leigh Creek. Much of the article is about the early radio facilities for the Leigh Creek airport and the radio technical staff who were sent to the town to install those facilities and make them work.

More on the Coal Mine

The open cut mine operation has been for low-grade, sub-bituminous black coal which is frequently referred to as hard brown coal or just brown coal. It was transported 250 km by rail to the Playford and Northern power stations outside Port Augusta on the east side of Spencer Gulf. The coal occurred in several nested bowl-shaped seams, each several metres thick.

The coalfield at Leigh Creek was originally set up in 1943 by the SA Government Electricity Trust of South Australia (ETSA) who also owned the power stations. However in 1998, the Government sold the interests of ETSA to private owners and the Leigh Creek mine and the Pt Augusta power stations became the property of Alinta Energy. The mine operated by Alinta, has produced over 2.5 million tonnes of coal a year. Alinta closed the mine on November 17, 2015, somewhat earlier than a closure anticipated in 2018 when the coal supply was expected to run out.

The story of how and why Leigh Creek was established is quite a saga which is described in detail in the series "The Battle for Leigh Creek" (Ref. 4). Prior to the 1940's, South Australia's main source of fuel, such as that to feed the Adelaide Electric Power stations at Osborne, was black coal from Newcastle. Supply of this coal became a problem, particularly during World War 2. It was SA Premier Sir Thomas Playford who then pressured Parliament to develop Leigh Creek coal amid quite a lot of opposition both from members in his own party and from the opposition party. But the proposal was passed and Sir Tom went on further to establish State owned power generation and State power distribution through the Electricity Trust of South Australia (ETSA). Leigh Creek coal was initially transported to the early Osborne power stations and eventually to the Pt. Augusta stations which were built later on.

The Town & Living

Information on early living conditions in Leigh Creek, following 1946, has been documented by Tom Robbins who was an ETSA engineer with the Leigh Creek mines for 13 years during that era. (Ref. 10). Tom described how Leigh Creek was fairly primitive

at that stage. There were only eight permanent houses in the town and tents housed about 200 workmen. There were only five privately owned cars and there was a galvanised iron shed on the outskirts which served as a store. They had a 30% turnover in workmen from a workforce of 300. Many of the workforce were new migrants from overseas. Road conditions were poor and the old narrow gauge railway to Alice Springs, stopping at Telford siding, was subject to flooding.

Water was also a major problem for the growing community. For a while it was carted from the Copley Dam and later it was piped from Sliding Rock mine site. By the 1950's, this was no longer adequate and the new Aroona dam was built across Scott Creek.

The Trains

Leigh Creek (Telford siding) was a stop on the old narrow gauge railway line from Quorn to Alice Springs. This line, owned by the Commonwealth Railways, was slow and inadequate for coal transfer to Port Augusta and it had to be upgraded. The Narrow gauge line of 3 foot six inch spacing was replaced with standard gauge line of four feet eight and a half inches spacing. At the same time, the route was changed to run all the way up the western side of the Flinders Ranges, rather than the old route up the east as far as Quorn and then via Pichi Richi Pass. The first coal train operations can be dated back to the early 1950's but the new line of 250 km was opened in 1956. This new railway is owned by the South Australian Government, but was leased in year 2000 to Flinders Power, apparently a subsidiary of Alinta Energy. The railway is due to be returned to the government in an operating condition in July 2017.

There is a bit of confusion concerning Flinders Power and Alinta Energy. Recent documentation now refers to Flinders Power as being responsible for the Leigh Creek Coalfield, the Port Augusta to Leigh Creek Railway, the Leigh Creek Township and the Pt. Augusta Power Stations. Past documentation had referred to Alinta Energy as being the responsible body. Flinders web site is stating that Flinders Power was previously part of Alinta Energy. This seems to imply that Flinders is now a separate company to Alinta.

Some data has been published on the coal trains which ran on the new route. The average length of a train was 2.950km, consisting of 3 locomotives, 168 coal wagons and 1 compressor wagon. Each wagon carried a maximum payload of 71 tonnes. The total maximum train coal capacity was 11,928 tonnes. Average haulage for year 2000 was 3 million tonnes and for year 2007, 4.1million tonnes..

Leigh Creek coal mine closed on November 17, 2015. The coal trains ran from coal stockpile until April 27, 2016 when the last train left Leigh Creek and arrived in Pt. Augusta on April 29. The Northern Power Station, the last of the two stations which had operated on Leigh Creek coal, closed on May 10.



Coal train from Leigh Creek

The Airfield

In 1945, the State Premier Sir Thomas Playford managed to convince the Commonwealth Government of the need for an Airport at Leigh Creek and this was granted. When the airfield was to be completed some five years later, it was to be taken over by the Department of Civil Aviation (DCA). Planes on the Adelaide-Darwin run would stop at Leigh Creek airport rather than at Mount Eba as had been the past practice.

The initial airfield was built about two kilometres north of the town. It had two graded runways of about fifteen hundred metres long. Sealing of the runways was arranged by DCA in 1950. When the town was moved in 1982, the airport also moved to a new location 1.9 km east of the newer town.

Radio Facilities for Leigh Creek Airport

In the late 1949 to early 1950, plans for the radio facilities at Leigh Creek airport were being prepared in Adelaide. I had several pre-installation trips to Leigh Creek, with Sid Ross (engineer responsible for radio installation planning) and Eric Halliday (at that time assisting with planning). But there was also one trip to put in temporary radio gear. I will explain why. For some time approaching late 1950, I had been working in the Parafield Radio Workshops supervising the building of racks to contain receivers and associated equipment, and a control console, for installation at Leigh Creek aeradio. Out of the blue, someone in DCA, with his wires somewhat crossed, had decided to open Leigh Creek airport. But there was no AC power then supplied to the airport, and we were still working at Parafield on the gear to be installed. Also, the resident communications officer at Mt Eba, Andy Fisher, was transferred to Leigh Creek and aeroplanes were authorised to land there instead of Mt. Eba. To use a phrase, we were caught on the hop.



In 1950, the Leigh Creek Power Station was unfinished

So we were directed to Leigh Creek post-haste. We installed in the recently constructed aeradio room, what receiver and control gear we had finished at Parafield and a rack mounted TA2J aircraft transmitter, which had been prepared as a permanent standby in the event of failure at the Transmitter Station. But no power was the problem. We were provided with a small petrol driven power unit, barely large enough for the aeradio station load, and which the operator (Andy) had to start up when aircraft were in range. This was hardly a reliable radio facility for a main airport but Andy was an aeradio operator of long experience and managed to cope with the situation. until mains power was made available.

Sealing of the runways at the airport was arranged by DCA in 1950 and an the inaugural flight to Leigh Creek was made by Trans Australia Airlines, (TAA) from Parafield, on 26 September 1950.

About the same time, a different group were setting up to install the Visual Aural Radio Range (VAR) at Leigh Creek. In 1948, two semi-trailer motor trucks set out for Leigh Creek with the Radio Range gear and technicians Dion Johnson, Peter Syme and John Ward. Also there were linemen to install the antenna tower; Jack Box and Eric Weeks under the supervision of Bill Hodby and Norm Kelly. The technical staff installed the equipment but were unable to do any testing as there was no AC power available.

However, technical staff Dion Johnson, Eric Kelly and John Ward returned in 1950 with an Austin Tandem Drive truck, loaded with a 25KVA Diesel power unit. This was set up to feed the VAR Range installation and they were able to carry out electrical tests.

Testing and calibration of the VAR tracks was carried out in a DCA aeroplane for various VAR installations by Frank Partridge . Frank arrived at Leigh Creek during our later aeradio installation phase (probably late 1950 or early 1951). For further reading, operation of the VAR system has been described in the article on Parafield Airport (Ref. 5).l



**Visual Aural Range (VAR) in 1950
at Leigh Creek & Austin truck
loaded with 25kVA power plant
(Photo John Ward, ref 6)**

Each of our 350 mile (560 km) trips north to Leigh Creek were by self drive vehicles. Much of the road to the north was unsealed and not well graded. It was easy to get bogged down in sandy sections. We often got used by DCA to run in new vehicles between Adelaide and Leigh Creek. They were then were loaded on to the railway at Copley for delivery further north. Starting at low speed and gradually increasing speed in steps at each progressive 100 miles was a bit stressful over that long rugged road.



**Lloyd Butler and Fred Sparks
on the then unsealed road to Leigh Creek
(Note the coats to protect from the dust)**

Of all the trips to Leigh Creek, I never had reason to go into the town proper. For each visit, we had been booked into the Copley Hotel for accommodation, probably difficult to arrange at that stage within the Leigh Creek town. Copley is about 17 km from the mine site and the original aerodrome site. Each day we had to drive from Copley to the aerodrome site and return at the end of the day.

The 1950 year moved on, power was connected to the airport and all our gear constructed in the workshop was ready. We then proceeded north to get the whole job finished, six radio technicians plus myself. I am not sure of the date but I think this commenced early in 1951. I spread the technicians on a range of jobs in the aeradio building and at the transmitter station. By the time we had arrived, the line party had been on the job and erected the towers and antennas at the transmitter station and the aeradio site. Our utility vehicle, from a previous visit, had been left behind for the line party to use but unfortunately, they had a crash and smashed up the vehicle. So we had to use their old blitzwaggon truck for our transportation. After completion of our installation work, Fred Sparks and I had to drive the slow and noisy old truck back home to Parafield at speeds difficult to achieve much above 25 miles per hour. It also gave us plenty of practice double de-clutching to change gear.



**Leigh Creek Radio Installation Team
at Copley Hotel
Len Clifford, John Mortimer, Fred Sparks,
Lloyd Butler, John Newman, Jack Marler
(not in photo - Paul Muscat)**



**Paul Muscat with the damaged utility vehicle.
The Copley Hotel, where we lodged, is in
the background**

The Radio Installation

To equip the transmitter station, we had a new AWA Multi-channel transmitter consisting of 12 separate cabinets of RF channel units and power-modulator units. (See photo). Each pair of HF RF cabinets shared a single power-modulator cabinet and the two MF/LF RF cabinets each had its own power-modulator cabinet. The latter were used for the 325 kHz communication channel and the LF/MF Non Directional Beacon (NDB) which operated on 395 kHz. Allocated HF frequencies for Leigh Creek were 3130 kHz and 6565 kHz for transmit and 3270 kHz and 6540 kHz for receive. Additional to the cabinets, but not shown in the photo, were racks of equipment associated with remote control from the Aeradio building. Power output from each of the RF cabinets was about 500 watts.



**Leigh Creek
Transmitter Station**



Leigh Creek AWA Multichannel Transmitter

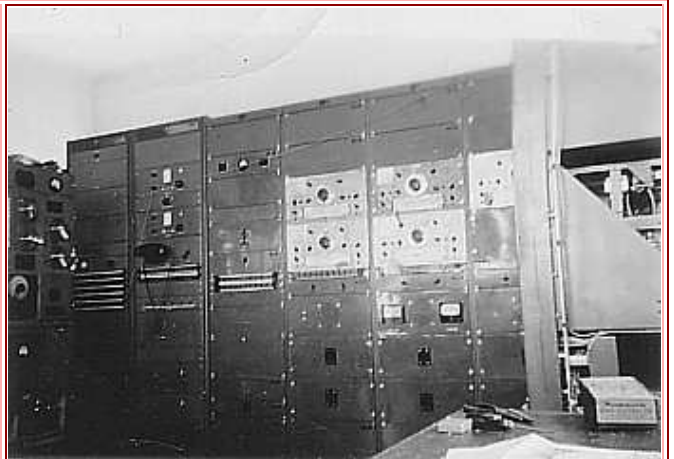
The cabinets had to be interwired and copper bus bars made for each RF output connection to its antenna. The units were made so that interwiring was made between the backs of the cabinets. However the timber floor of the transmitter had a trapdoor allowing limited access to underneath the floor. On a previous visit, Eric Halliday had expressed a desire to make use of the trapdoor, and conceal the wiring by interconnecting under the floor. This really presented a problem as the base of the cabinets were thick steel and there was a difficulty in drilling holes through this steel to pass the cables. Fred Sparks and Paul Muscat were allocated to the work at the transmitter station and they found out that ETSA had a giant hand held drill nearly as large as themselves. Their initiative in finding that drill in remote Leigh Creek got the job done, much to my relief I might add.

So the wiring underneath went in but there was another problem. To feed the wiring loom through, one technician had to operate from under the floor. In doing so, one (I think it was Paul) met a snake and they decided they weren't going down the hole any more. Not being a leader of such valour, I am not sure that I wanted to go down the hole either. So on that job, work stopped for several days. But time heals a lot of things and eventually they found courage to go back down the hole. They never saw the snake again and probably the snake never saw them - probably frightened by the sight of humans.

By this time, the Aeradio Room at the airport had finally been connected with real ETSA power and underground communication cables had been run to the Transmitter Station for transmitter control. The equipment racks and operator control console in the aeradio room are shown in the photographs with communications officer Andy Fisher and technician John Newman on the job. Four crystal controlled AR7 receivers with codan attachments are shown in the racks, providing four crystal locked fixed frequencies. A tunable AR7 is also provided in the console. The TA2J standby transmitter is in the rack at the right of the photograph. The two racks on the left contain line terminal equipment and remote control equipment associated with transmitters. The receiver racks, the TA2J rack and the console, had all been assembled and wired up in our Parafield radio workshop.



**Leigh Creek Aeradio Control Console
Communications Officer - Andy Fisher
and technician - John Newman**



**Leigh Creek
Aeradio Receivers and Control Racks**

Apart from our snake incident, everything worked out as had been previously planned in Parafield and there were no problems with the interwiring details I had prepared in our workshop. With everything working as planned, we left Leigh Creek.

Some problems later on

But some months later I was recalled to Leigh Creek. A mouse had somehow got into one of the Multichannel Transmitter cabinets. Apart from electrocuting itself, it started a fire which burnt up the AWA interwiring in the base of the cabinet. It is interesting that the wiring between cabinets, which we had put in, was intact. AWA seemed to have a practice of using plain rubber covered wire to interwire their transmitters. I recall that our radio workshops had to completely rewire an AWA AT13 transmitter because this wire used had simply perished with age. And it would certainly burn. It was our practice in the Radio Workshop to use aircraft type cable for wiring within racks and interconnecting between them. Being type approved for aircraft, it was very expensive. But it was also a retardant to fire and we had used this wire for interwiring between the racks at Leigh Creek. It certainly proved itself in this event. The burnt AWA wiring was replaced and that was my last visit to Leigh Creek.

By 1957, I had had been well established in what was then the Long Range Weapons Establishment (LRWE). But in the book (Ref 6) written by John (Joe) Ward on his experiences in DCA, he reported that the building housing Aeradio was burnt down in that year. The building sections, housing the office of Officer-in-Charge and the waiting rooms, were "write-offs". However, whilst the radio equipment was damaged by water, ash and soot, the maintenance technical staff were able to clean it up and get back on the air in just 48 hours. The same aircraft type cable, as that we had used in the Transmitter Station, was also used in our workshops to wire up the racks and console. One might assume that the use of the fire resistant aircraft wire, again helped to save the day.



Fire in 1957
Most of the building was burnt to the ground.
The section housing Aeradio was still standing.
The radio equipment, after clean up, was recovered. (Photo ref. 6)

Leigh Creek Today

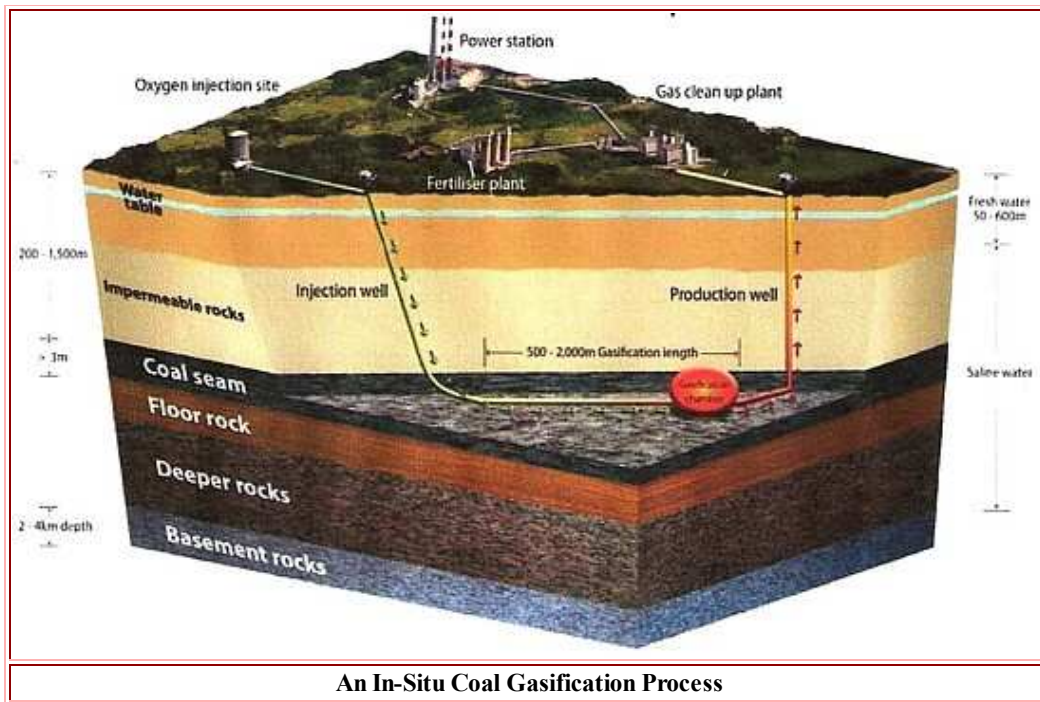
Since the Leigh Creek coal mine closed operations in November 2015, there have been all sorts of suggestions on how the town and its industry can be kept alive. It had been reported that coal from the open cut mining was running out and this gave reason to shut down the Port Augusta power stations.. However it would appear that there is a lot of coal still there, but it is too deep for the existing open cut operation.



Leigh Creek open cut mine in 2015

One ASX listed company, Leigh Creek Energy Project (LCEP), has announced a proposal to extract gas from Leigh Creek's coal seams by drilling injection and extraction wells and igniting the coal underground. They would be using a process known as In-situ Coal Gasification, or Underground Coal Gasification (UGG). The company has proposed that the gas would be exported to Australia's eastern states via existing pipeline networks. An additional plant to produce ammonium nitrate fertilizer and explosives for use in the mining sector would also be built adjacent to the coal gasification plant. The Company has been building a demonstration facility at Leigh Creek, expected to be completed for display by the end of 2017.

Underground coal gasification (UCG) is an industrial process which converts coal into product gas. UCG is an in-situ gasification process carried out in non-mined coal seams using injection of oxidants, and bringing the product gas to surface through production wells drilled from the surface. The predominant product gases are methane, hydrogen, carbon monoxide and carbon dioxide. Ratios between these vary depending upon formation pressure, depth of coal and oxidant balance.



Mining companies in Queensland have conducted pilot projects using UGG but there have been environmental concerns. In April, 2016 the Queensland Government banned UGG. Their Mines Minister stated "The potential risks to Queensland's environment, and our valuable agricultural industries, far outweigh any potential economic benefits". So that raises the question of whether the idea of developing UGG for Leigh Creek would be acceptable in South Australia. This question is raised in the attached Appendix where I have tried to track down what is happening with the Leigh Creek Energy Project and its acceptance.

The Leigh Creek town, at its new location, was built by the State Government in 1982. ETSA interests in SA power (Government owned) were sold to private industry in 1989, and the town was leased to Alinta Energy, the new owners of the Pt. Augusta power stations and the Leigh Creek mine. As a result of the mine closure, the lease will be handed back in 2018.

Whilst the coal train from Leigh Creek to Pt. Augusta has ceased operations, the standard gauge railway remains as an operational system available for other transport functions if required.

The Leigh Creek Airport is still running and possibly the best equipped of the northern regional airports in SA. On navigation aids, it has had an NDB on 287 kHz and up to early 2016, a Visual Omnidirection Radio Range (VOR) on 117.8 MHz. More recently in Australian airways, there have been changes called the Aircraft Navigation Modernisation Program. This entails a transition to the Global Navigation Satellite System (GNSS) and phasing out of earlier navigation systems. Because of this, Leigh Creek VOR was programmed to be phased out on May 26, 2016. Of course the earlier VAR ranges (including the original installation at Leigh Creek around 1950) were all phased out about 1976.

Leigh Creek airport is still a good base for aircraft operating in the mid north region. The earlier need for a fuelling stop at Leigh Creek by north running airlines, would have been phased out years ago by the modern jet aircraft, which operate longer hops.

In April 2017, it was announced that Leigh Creek Airport would be set up as a training location for student aeronautical pilots. Parafield Airport based company, Flight Training Adelaide, proposed to launch a six-week trial at the end of July, which would enable students to complete, at Leigh Creek, part of its commercial pilot training course. This would initially involve 12 student pilots, four planes and four staff. The State Government is contributing \$40,000 to upgrade the airport facilities to allow for year-round pilot training in the Northern Flinders Ranges region.

It is hoped the pilot training venture will bring economic benefits to the town which has suffered employment and population losses since the Leigh Creek coal mine closed. The Leigh Creek population peaked at around 2500 in the late 1980 but dwindled to around 500 by the time Alinta Energy announced plans to close the mine in June 2015. More recently It has dropped to about 200 people.

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- (3) Aeradio Installations for DCA around 1940 - 1954 in the SA Region by Lloyd Butler <http://users.tpg.com.au/users/ldbutler/DCA.htm>
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Appendix

Leigh Creek gas challenged

The Leigh Creek Energy company has proceeded with the demonstration project in 2017. However by October, 2017, community and indigenous groups in the Leigh Creek area were considering lodging a court injunction to block the underground coal gasification going ahead in the area. But Leigh Creek Energy, has said that it had worked constructively with the appropriate native title group for the region and had done extensive work to ensure the project would be environmentally sustainable.

The company's chief operating officer Justin Haines reported that geology in the Leigh Creek region was such that the process could be safely carried out and that the Company was in the final stages of preparing its environmental impact report.

As water is a vital resource in regional communities, studies were undertaken to address potential impacts to ground water and surface water. The company representatives said they had been speaking with the legal native title representatives for the area and the Adnyamathanha Traditional Lands Association and had done extensive hydrology work performed by an independent consultant

Groundwater studies completed showed that there were no aquifers present at, or near, the demonstration site, the gasifier was surrounded by very low permeability aquitards, there were no groundwater receptors present and there no credible pathways existed to groundwater receptors.

Failure to reach an agreement on the environmental questions could prevent the project from advancing to the completed demonstration phase of flaring up the coal in late 2017.

In January 30, 2018, National News announced that a failed energy company, Linc Energy, was accused of knowingly and illegally polluting a significant part of Queensland's Darling Downs and has faced trial in a landmark criminal case in Brisbane. Linc Energy was engaged in operating an Underground Coal Gasification (UCG) plant at Chinchilla and is charged with five counts of wilfully and unlawfully causing environmental harm between 2007 and 2013 after allegedly allowing toxic gas to leak from its operations.

Apparently the toxic gas bubbled from the ground and water was polluted to the point that it was unfit for stock to consume. But the company kept operating. It was stated that Linc did nothing to stop, mitigate or rehabilitate the state of affairs that Linc itself had caused. As part of the UCG process, Linc injected air into the ground, which created and enlarged fractures. It tried to concrete surface cracks and use wells to control pressure but it was said that they didn't sufficiently reduce risks or damage. This latest news concerning the Chinchilla UCG operation could well be of sufficient influence to sink the existing UCG operation in hand at Leigh Creek.

In the Advertiser of 20-4-18, it reported the Company saying it had received a "Statement of Environmental Objectives Approval" and that it expected to produce gas from the plant by the end of June 2018. However there was one opposing Group still attempting action to stop the project proceeding.

In the Advertiser of 4-08-18, it was reported that Pre-Commercial Demonstration (PCD) approval had been granted. The Companies demonstration project consists of two wells drilled into a deep coal seam, with one an inlet well for the addition of air and water, and the other for the extraction of syngas. This is a further step towards commercial production of syngas.

References

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(3) Presentation to JCEC 22 March 2018 Leigh Creek Energy ISG Project - pdf file